

**AMENDMENTS TO THE CLAIMS**

1     1.     (Currently Amended) A method for marking one or more packets of data in a  
2           packet-switched network based on achieved flow bandwidth information within  
3           the network, comprising the computer-implemented steps of:  
4           receiving a first group of one or more packets of a data flow ~~from~~ at a router in the  
5           network;  
6           marking the first group of one or more packets of said data flow with a first  
7           behavioral treatment value, wherein the first behavioral treatment value  
8           directs devices within the network to treat the first group of one or more  
9           packets with a first quality of service treatment;  
10          transmitting the first group of one or more packets of said data flow in the  
11          network;  
12          determining an achieved flow bandwidth for the data flow based on data traffic  
13          within the network;  
14          determining packet flow characteristics of the first group of one or more packets  
15          of said data flow;  
16          determining a second behavioral treatment value based on the achieved flow  
17          bandwidth for the data flow within the network and on the packet flow  
18          characteristics of the first group of one or more packets of the data flow;  
19          receiving a second group of one or more packets of said data flow ~~from~~ at the  
20          router in the network;

21 marking the second group of one or more packets of said data flow with said  
22 second behavioral treatment value, wherein the second behavioral  
23 treatment value directs devices within the network to treat the second  
24 group of one or more packets with a second quality of service treatment  
25 that is different than the first quality of service treatment; and  
26 transmitting the second group of one or more packets of said data flow in the  
27 network; and  
28 repeating the preceding steps for successive groups of one or more packets of said  
29 data flow, wherein each of the successive groups is dynamically marked  
30 with a behavioral treatment value that is determined based at least in part  
31 on a successively determined achieved flow bandwidth for the data flow.

1 2. (Original) The method as recited in Claim 1, wherein:  
2 the step of marking a first group of one or more packets includes the step of  
3 storing a first differentiated services codepoint (DSCP) value in each  
4 header of the first group of one or more packets of a data flow;  
5 the step of determining a second behavioral treatment value includes the step of  
6 determining a second DSCP value; and  
7 the step of marking a second group of one or more packets includes the step of  
8 storing the second DSCP value in each header of the second group of one  
9 or more packets of a data flow.

1 3. (Currently Amended) The method as recited in Claim 1, ~~further comprising the~~  
2 ~~steps of~~ wherein:

3 ~~determining packet flow characteristics of the first group of one or more packets~~  
4 ~~of a data flow; and~~  
5 determining the second behavioral treatment value is further based on the  
6 available bandwidth within the network ~~and the packet flow characteristics~~  
7 ~~of the first group of one or more packets of a data flow.~~

1 4. (Original) The method as recited in Claim 1, further comprising the steps of:  
2 establishing a Quality of Service (QoS) policy for applying a per-hop-behavior  
3 treatment for forwarding packets within a flow in said network; and  
4 generating the first behavioral treatment value based on the established QoS  
5 policy.

1 5. (Currently Amended) A computer-readable medium carrying one or more  
2 sequences of instructions for marking one or more packets of data in a packet-  
3 switched network based on achieved flow bandwidth information within the  
4 network, wherein execution of the one or more sequences of instructions by one or  
5 more processors causes the one or more processors to perform the steps of:  
6 receiving a first group of one or more packets of a data flow ~~from~~ at a router in the  
7 network;  
8 marking the first group of one or more packets of said data flow with a first  
9 behavioral treatment value, wherein the first behavioral treatment value  
10 directs devices within the network to treat the first group of one or more  
11 packets with a first quality of service treatment;

12 transmitting the first group of one or more packets of said data flow in the  
13 network;  
14 determining an achieved flow bandwidth for the data flow based on data traffic  
15 within the network;  
16 determining packet flow characteristics of the first group of one or more packets  
17 of said data flow;  
18 determining a second behavioral treatment value based on the achieved flow  
19 bandwidth for the data flow within the network and on the packet flow  
20 characteristics of the first group of one or more packets of the data flow;  
21 receiving a second group of one or more packets of said data flow ~~from~~ at the  
22 router in the network;  
23 marking the second group of one or more packets of said data flow with said  
24 second behavioral treatment value, wherein the second behavioral  
25 treatment value directs devices within the network to treat the second  
26 group of one or more packets with a second quality of service treatment  
27 that is different than the first quality of service treatment; and  
28 transmitting the second group of one or more packets of said data flow in the  
29 network; and  
30 repeating the preceding steps for successive groups of one or more packets of said  
31 data flow, wherein each of the successive groups is dynamically marked  
32 with a behavioral treatment value that is determined based at least in part  
33 on a successively determined achieved flow bandwidth for the data flow.

1 6. (Original) The computer-readable medium as recited in Claim 5, wherein:

2 the step of marking a first group of one or more packets includes the step of  
3 storing a first differentiated services codepoint (DSCP) value in each  
4 header of the first group of one or more packets of a data flow;  
5 the step of determining a second behavioral treatment value includes the step of  
6 determining a second DSCP value; and  
7 the step of marking a second group of one or more packets includes the step of  
8 storing the second DSCP value in each header of the second group of one  
9 or more packets of a data flow.

1 7. (Currently Amended) The computer-readable medium as recited in Claim 5,  
2 ~~further comprising instructions for performing the steps of wherein:~~  
3 ~~determining packet flow characteristics of the first group of one or more packets~~  
4 ~~of a data flow; and~~  
5 determining the second behavioral treatment value is further based on the  
6 available bandwidth within the network ~~and the packet flow characteristics~~  
7 ~~of the first group of one or more packets of a data flow.~~

1 8. (Original) The computer-readable medium as recited in Claim 5, further  
2 comprising instructions for performing the steps of:  
3 establishing a Quality of Service (QoS) policy for applying a per-hop-behavior  
4 treatment for forwarding packets within a flow in said network; and  
5 generating the first behavioral treatment value based on the established QoS  
6 policy.

1 9. (Currently Amended) A computer apparatus comprising:

2       a processor; and

3       a memory coupled to the processor, the memory containing one or more

4               sequences of instructions for marking one or more packets of data in a

5               packet-switched network based on achieved flow bandwidth information

6               within the network, wherein execution of the one or more sequences of

7               instructions by the processor causes the processor to perform the steps of:

8               receiving a first group of one or more packets of a data flow from the

9               network;

10              marking the first group of one or more packets of said data flow with a

11              first behavioral treatment value, wherein the first behavioral

12              treatment value directs devices within the network to treat the first

13              group of one or more packets with a first quality of service treatment;

14              transmitting the first group of one or more packets of said data flow in the

15              network;

16              determining an achieved flow bandwidth for the data flow based on data

17              traffic within the network;

18              determining packet flow characteristics of the first group of one or more

19              packets of said data flow;

20              determining a second behavioral treatment value based on the achieved

21              flow bandwidth for the data flow within the network and on the

22              packet flow characteristics of the first group of one or more packets

23              of the data flow;

24 receiving a second group of one or more packets of said data flow from the  
25 network;  
26 marking the second group of one or more packets of said data flow with  
27 said second behavioral treatment value, wherein the second  
28 behavioral treatment value directs devices within the network to treat  
29 the second group of one or more packets with a second quality of  
30 service treatment that is different than the first quality of service  
31 treatment; and  
32 transmitting the second group of one or more packets of said data flow in  
33 the network; and  
34 repeating the preceding steps for successive groups of one or more packets  
35 of said data flow, wherein each of the successive groups is  
36 dynamically marked with a behavioral treatment value that is  
37 determined based at least in part on a successively determined  
38 achieved flow bandwidth for the data flow;  
39 wherein the computer apparatus is any one of a bridge, a switch, and a router.

- 1 10. (Original) The computer apparatus as recited in Claim 9, wherein:  
2 the step of marking a first group of one or more packets includes the step of  
3 storing a first differentiated services codepoint (DSCP) value in each  
4 header of the first group of one or more packets of a data flow;  
5 the step of determining a second behavioral treatment value includes the step of  
6 determining a second DSCP value; and

7 the step of marking a second group of one or more packets includes the step of  
8 storing the second DSCP value in each header of the second group of one  
9 or more packets of a data flow.

1 11. (Currently Amended) The computer apparatus as recited in Claim 9, ~~further~~  
2 ~~comprising instructions for performing the steps of wherein:~~  
3 ~~determining packet flow characteristics of the first group of one or more packets~~  
4 ~~of a data flow; and~~  
5 determining the second behavioral treatment value is further based on the  
6 available bandwidth within the network ~~and the packet flow characteristics~~  
7 ~~of the first group of one or more packets of a data flow.~~

1 12. (Original) The computer apparatus as recited in Claim 9, further comprising  
2 instructions for performing the steps of:  
3 establishing a Quality of Service (QoS) policy for applying a per-hop-behavior  
4 treatment for forwarding packets within a flow in said network; and  
5 generating the first behavioral treatment value based on the established QoS  
6 policy.

1 13. (Currently Amended) A network device configured for marking one or more  
2 packets of data in a packet-switched network based on achieved flow bandwidth  
3 information within the network, comprising:  
4 means for receiving a first group of one or more packets of a data flow from the  
5 network;



6 means for marking the first group of one or more packets of said data flow with a  
7 first behavioral treatment value, wherein the first behavioral treatment  
8 value directs devices within the network to treat the first group of one or  
9 more packets with a first quality of service treatment;  
10 means for transmitting the first group of one or more packets of said data flow in  
11 the network;  
12 means for determining an achieved flow bandwidth for the data flow based on  
13 data traffic within the network;  
14 means for determining packet flow characteristics of the first group of one or  
15 more packets of said data flow;  
16 means for determining a second behavioral treatment value based on the achieved  
17 flow bandwidth for the data flow within the network and on the packet  
18 flow characteristics of the first group of one or more packets of the data  
19 flow;  
20 means for receiving a second group of one or more packets of said data flow from  
21 the network;  
22 means for marking the second group of one or more packets of said data flow with  
23 said second behavioral treatment value, wherein the second behavioral  
24 treatment value directs devices within the network to treat the second  
25 group of one or more packets with a second quality of service treatment  
26 that is different than the first quality of service treatment; and

27 means for transmitting the second group of one or more packets of said data flow  
28 in the network; and  
29 means for repeating the preceding steps for successive groups of one or more  
30 packets of said data flow, wherein each of the successive groups is  
31 dynamically marked with a behavioral treatment value that is determined  
32 based at least in part on a successively determined achieved flow  
33 bandwidth for the data flow;  
34 wherein the network device is any one of a bridge, a switch, and a router.

1 14. (Currently Amended) A method for marking one or more packets of data in a  
2 packet-switched network based on achieved flow bandwidth information  
3 within the network, comprising the computer-implemented steps of:  
4 causing one or more network devices to receive a first group of one or more  
5 packets of a data flow from the network;  
6 causing the one or more network devices to mark the first group of one or  
7 more packets of said data flow with a first behavioral treatment value,  
8 wherein the first behavioral treatment value directs devices within the  
9 network to treat the first group of one or more packets with a first  
10 quality of service treatment;  
11 causing the one or more network devices to transmit the first group of one or  
12 more packets of said data flow in the network;  
13 determining an achieved flow bandwidth for the data flow based on data  
14 traffic within the network;

15        determining packet flow characteristics of the first group of one or more  
16                packets of said data flow;  
17        determining a second behavioral treatment value based on the achieved flow  
18                bandwidth for the data flow within the network and on the packet flow  
19                characteristics of the first group of one or more packets of the data  
20                flow;  
21        causing the one or more network devices to receive a second group of one or  
22                more packets of said data flow from the network;  
23        causing the one or more network devices to mark the second group of one or  
24                more packets of said data flow with said second behavioral treatment  
25                value, wherein the second behavioral treatment value directs devices  
26                within the network to treat the second group of one or more packets  
27                with a second quality of service treatment that is different than the first  
28                quality of service treatment; and  
29        causing the one or more network devices to transmit the second group of one  
30                or more packets of said data flow in the network; and  
31        causing the one or more network devices to repeat the preceding steps for  
32                successive groups of one or more packets of said data flow, wherein  
33                each of the successive groups is dynamically marked with a behavioral  
34                treatment value that is determined based at least in part on a  
35                successively determined achieved flow bandwidth for the data flow.

- 1    15.    (Previously Presented) The method as in claim 1, wherein the first behavioral  
2           treatment is determined without regard to the achieved flow bandwidth.

- 1    16.    (Previously Presented) The method as in claim 1, wherein the second behavioral  
2           treatment is a behavioral treatment that provides a lower level of service than  
3           other available choices of behavioral treatments; and  
4           wherein the second behavioral treatment provides a high enough level of service  
5           to accommodate the achieved flow bandwidth.
- 1    17.    (Previously Presented) The method as in claim 1, wherein the second behavioral  
2           treatment is a behavioral treatment that provides a minimum level of service that  
3           is a sufficient level of service to accommodate the achieved flow bandwidth.
- 1    18.    (Previously Presented) The method as in claim 1, wherein the step of marking the  
2           first group is performed by at least communicating the first behavioral treatment  
3           to a differentiated services node located at a border of a differentiated services  
4           domain; and  
5           wherein the step of marking the second group is performed by at least  
6           communicating the second behavioral treatment to the differentiated  
7           services node.
- 1    19.    (Canceled)
- 1    20.    (Canceled)
- 1    21.    (Previously Presented) The method as in claim 1, wherein the step of determining  
2           the achieved flow bandwidth is performed by at least estimating the achieved flow  
3           bandwidth based on Management Information Base (MIB) variables.

1    22.    (Previously Presented) The method as in claim 1, wherein the step of determining  
2            the achieved flow bandwidth is performed by at least checking a Transfer Control  
3            Protocol/ Internet Protocol (TCP/IP) window size and determining a value for the  
4            achieved flow bandwidth based on the TCP/IP window size.

1    23.    (Previously Presented) The method as in claim 1, wherein the step of determining  
2            the achieved flow bandwidth is based on reception quality feedback from a Real-  
3            Time Transport Protocol (RTP) receiver.

1    24.    (Currently Amended) A method for marking one or more packets of data in a  
2            packet-switched network based on achieved flow bandwidth information within  
3            the network, comprising the computer-implemented steps of:  
4            receiving a first group of packets of a plurality of data flows ~~from~~ at a router in the  
5                                  network;  
6            marking the first group of packets of said plurality of data flows with an initial set  
7                                  of behavioral treatment values, wherein the ~~first~~ initial set of behavioral  
8                                  treatment values direct devices within the network to treat the first group  
9                                  of packets with an initial set of quality of service treatments;  
10          transmitting the first group of packets of said plurality of data flows in the  
11                                  network;  
12          determining achieved flow bandwidths, wherein an achieved flow bandwidth is  
13                                  determined for each of the plurality of data flows based on data traffic  
14                                  within the network;

15        determining packet flow characteristics of the first group of packets of said  
16                plurality of data flows;  
17        determining an updated set of behavioral treatment values based on the achieved  
18                flow bandwidths within the network and on the packet flow characteristics  
19                of the first group of packets;  
20        receiving a second group of packets of said plurality of data flows ~~from~~ at the  
21                router in the network;  
22        after the steps of marking the first group and determining the updated set of  
23                behavioral treatment values, marking the second group packets of said  
24                plurality of data flows with said updated set of behavioral treatment  
25                values, wherein the updated set of behavioral treatment values direct  
26                devices within the network to treat the second group of packets with an  
27                updated set of quality of service treatments that is different than the initial  
28                set of quality of service treatments; and  
29        transmitting the second group of packets of said plurality of data flows in the  
30                network; and  
31        repeating the preceding steps for successive groups of packets of said plurality of  
32                data flows, wherein each of the successive groups is dynamically marked  
33                with a set of behavioral treatment values that is determined based at least  
34                in part on successively determined achieved flow bandwidths for said  
35                plurality of data flows.

- 1        25.        (Currently Amended) A method for performing packet marking comprising the  
2                computer-implemented steps of:

3 defining an initial set of Quality of Service (QoS) values for coloring packets  
4 within a plurality of data flows, wherein each of the QoS values indicates  
5 an allocation of bandwidth;  
6 coloring a first group of one or more packets of a given data flow selected from  
7 the plurality of data flows, without regard to an achieved flow bandwidth,  
8 by at least:  
9 communicating the initial set of QoS values to each of one or more edge  
10 differentiated services domain nodes that are located at one or  
11 more edges of a differentiated services domain, and  
12 the one or more edge differentiated services domain nodes using one or  
13 more of the initial set of QoS values to color the first group;  
14 estimating traffic bandwidth within the network based on bandwidth information  
15 corresponding to a current traffic pattern of the network, wherein the  
16 traffic bandwidth estimated includes an achieved flow bandwidth for the  
17 given data flow;  
18 determining packet flow characteristics of the first group of one or more packets  
19 of the given data flow;  
20 determining an updated set of QoS values for coloring packets within the plurality  
21 of data flows, based on the traffic bandwidth estimated and on the packet  
22 flow characteristics of the first group of one or more packets,  
23 wherein the updated set of QoS values provide lower levels of service than  
24 other available choices of QoS values, and

25            wherein the updated set of QoS values provide a high enough level of  
26            service to accommodate the traffic bandwidth estimated;  
27            coloring a subsequent group of one or more packets of the given data flow with  
28            the one or more of updated set of QoS values by at least;  
29            communicating the updated set of QoS values to each of one or more edge  
30            differentiated services domain nodes, and  
31            the one or more edge differentiated services domain nodes using one or  
32            more of the updated set of QoS values to color the subsequent  
33            group; and  
34            repeating the steps of estimating traffic bandwidth, determining packet flow  
35            characteristics, determining an updated set of QoS values, and coloring a  
36            subsequent group multiple times, therein tuning the network on an  
37            ongoing basis.

1    26.    (Previously Presented) The method as in claim 24, wherein the initial set of QoS  
2            values is an initial set of Differentiated Services Codepoint (DSCP) values;  
3            wherein the updated set of QoS values is an updated set of DSCP values;  
4            wherein the step of estimating traffic bandwidth further comprises the steps of:  
5            defining one or more QoS policies that specify target bandwidth values  
6            and a range of possible services for each the plurality of data  
7            flows, wherein a given target bandwidth value is specified for the  
8            given data flow, and wherein the given target bandwidth identifies  
9            a specific bandwidth that is desirous or required by the given data  
10           flow;



11                   gathering information about the traffic bandwidth; and  
12                   determining the traffic bandwidth based on the information gathered.

1    27.   (Previously Presented) The method of claim 1, wherein the data flow is  
2           associated with only one behavioral treatment at any given time.

1    28.   (Previously Presented) The method of claim 24, wherein each data flow is  
2           associated with only one behavioral treatment at any given time.

1    29.   (Previously Presented) The method of claim 1, wherein the achieved flow  
2           bandwidth is a percentage of the network bandwidth.

1    30.   (Previously Presented) The method claim 29, wherein the second behavioral  
2           treatment results in the data flow having a different achieved flow bandwidth,  
3           which is a different percentage of the network bandwidth.

1    31.   (Previously Presented) The method of claim 1, wherein the determining of the  
2           second behavioral treatment is in response to a determination of achieved flow  
3           bandwidth resulting from the determining of the achieved flow bandwidth.

1    32.   (Previously Presented) The computer-readable medium as in claim 5, wherein the  
2           first behavioral treatment is determined without regard to the achieved flow  
3           bandwidth.

1    33.   (Previously Presented) The computer-readable medium as in claim 5, wherein the  
2           second behavioral treatment is a behavioral treatment that provides a lower level  
3           of service than other available choices of behavioral treatments; and

4            wherein the second behavioral treatment provides a high enough level of service  
5            to accommodate the achieved flow bandwidth.

1    34.    (Previously Presented) The computer-readable medium as in claim 5, wherein the  
2            second behavioral treatment is a behavioral treatment that provides a minimum  
3            level of service that is a sufficient level of service to accommodate the achieved  
4            flow bandwidth.

1    35.    (Previously Presented) The computer-readable medium as in claim 5, wherein the  
2            step of marking the first group is performed by at least communicating the first  
3            behavioral treatment to a differentiated services node located at a border of a  
4            differentiated services domain; and  
5            wherein the step of marking the second group is performed by at least  
6            communicating the second behavioral treatment to the differentiated  
7            services node.

1    36.    (Canceled)

1    37.    (Canceled)

1    38.    (Previously Presented) The computer-readable medium as in claim 5, wherein the  
2            step of determining the achieved flow bandwidth is performed by at least  
3            estimating the achieved flow bandwidth based on Management Information Base  
4            (MIB) variables.

1    39.    (Previously Presented) The computer-readable medium as in claim 5, wherein the  
2            step of determining the achieved flow bandwidth is performed by at least

3       checking a Transfer Control Protocol/ Internet Protocol (TCP/IP) window size  
4       and determining a value for the achieved flow bandwidth based on the TCP/IP  
5       window size.

1   40.   (Previously Presented) The computer-readable medium as in claim 5, wherein the  
2       step of determining the achieved flow bandwidth is based on reception quality  
3       feedback from a Real-Time Transport Protocol (RTP) receiver.

1   41.   (Currently Amended) A computer-readable medium carrying one or more  
2       sequences of instructions for marking one or more packets of data in a packet-  
3       switched network based on achieved flow bandwidth information within the  
4       network, wherein execution of the one or more sequences of instructions by one or  
5       more processors causes the one or more processors to perform the ~~method~~  
6       comprising steps of:

7       receiving a first group of packets of a plurality of data flows ~~from~~ at a router in the  
8       network;

9       marking the first group of packets of said plurality of data flows with an initial set  
10       of behavioral treatment values, wherein the ~~first~~ initial set of behavioral  
11       treatment values direct devices within the network to treat the first group  
12       of packets with an initial set of quality of service treatments;

13       transmitting the first group of packets of said plurality of data flows in the  
14       network;

15 determining achieved flow bandwidths, wherein an achieved flow bandwidth is  
16 determined for each of the plurality of data flows based on data traffic  
17 within the network;  
18 determining packet flow characteristics of the first group of packets of said  
19 plurality of data flows;  
20 determining an updated set of behavioral treatment values based on the achieved  
21 flow bandwidths within the network and on the packet flow characteristics  
22 of the first group of packets;  
23 receiving a second group of packets of said plurality of data flows ~~from~~ at the  
24 router in the network;  
25 after the steps of marking the first group and determining the updated set of  
26 behavioral treatment values, marking the second group packets of said  
27 plurality of data flows with said updated set of behavioral treatment  
28 values, wherein the updated set of behavioral treatment values direct  
29 devices within the network to treat the second group of packets with an  
30 updated set of quality of service treatments that is different than the initial  
31 set of quality of service treatments; and  
32 transmitting the second group of packets of said plurality of data flows in the  
33 network; and  
34 repeating the preceding steps for successive groups of packets of said plurality of  
35 data flows, wherein each of the successive groups is dynamically marked  
36 with a set of behavioral treatment values that is determined based at least

37           in part on successively determined achieved flow bandwidths for said  
38           plurality of data flows.

1     42.   (Currently Amended) A computer-readable medium carrying one or more  
2           sequences of instructions for marking one or more packets of data in a packet-  
3           switched network based on achieved flow bandwidth information within the  
4           network, wherein execution of the one or more sequences of instructions by one  
5           or more processors causes the one or more processors to perform the ~~method~~  
6           comprising steps of:  
7           defining an initial set of Quality of Service (QoS) values for coloring packets  
8                       within a plurality of data flows, wherein each of the QoS values indicates  
9                       an allocation of bandwidth;  
10          coloring a first group of one or more packets of a given data flow selected from  
11                       the plurality of data flows, without regard to an achieved flow bandwidth,  
12                       by at least;  
13          communicating the initial set of QoS values to each of one or more edge  
14                       differentiated services domain nodes that are located at one or  
15                       more edges of a differentiated services domain, and  
16          the one or more edge differentiated services domain nodes using one or  
17                       more of the initial set of QoS values to color the first group;  
18          estimating traffic bandwidth within the network based on bandwidth information  
19                       corresponding to a current traffic pattern of the network, wherein the  
20                       traffic bandwidth estimated includes an achieved flow bandwidth for the  
21                       given data flow;

22        determining packet flow characteristics of the first group of one or more packets  
23                of the given data flow;  
24        determining an updated set of QoS values for coloring packets within the plurality  
25                of data flows, based on the traffic bandwidth estimated and on the packet  
26                flow characteristics of the first group of one or more packets,  
27                wherein the updated set of QoS values provide lower levels of service than  
28                other available choices of QoS values, and  
29                wherein the updated set of QoS values provide a high enough level of  
30                service to accommodate the traffic bandwidth estimated;  
31        coloring a subsequent group of one or more packets of the given data flow with  
32                the one or more of updated set of QoS values by at least;  
33                communicating the updated set of QoS values to each of one or more edge  
34                differentiated services domain nodes, and  
35                the one or more edge differentiated services domain nodes using one or  
36                more of the updated set of QoS values to color the subsequent  
37                group; and  
38        repeating the steps of estimating traffic bandwidth, determining packet flow  
39                characteristics, determining an updated set of QoS values, and coloring a  
40                subsequent group multiple times, therein tuning the network on an  
41                ongoing basis.

- 1    43.    (Previously Presented) The computer-readable medium as in claim 41, wherein  
2           the initial set of QoS values is an initial set of Differentiated Services Codepoint  
3           (DSCP) values;

4 wherein the updated set of QoS values is an updated set of DSCP values;  
5 wherein the step of estimating traffic bandwidth further comprises the steps of:  
6       defining one or more QoS policies that specify target bandwidth values  
7       and a range of possible services for each the plurality of data  
8       flows, wherein a given target bandwidth value is specified for the  
9       given data flow, and wherein the given target bandwidth identifies  
10      a specific bandwidth that is desirous or required by the given data  
11      flow;  
12      gathering information about the traffic bandwidth; and  
13      determining the traffic bandwidth based on the information gathered.

1 44. (Previously Presented) The computer-readable medium of claim 5, wherein the  
2 data flow is associated with only one behavioral treatment at any given time.

1 45. (Previously Presented) The computer readable medium of claim 41, wherein each  
2 data flow is associated with only one behavioral treatment at any given time.

1 46. (Previously Presented) The computer-readable medium of claim 5, wherein the  
2 achieved flow bandwidth is a percentage of the network bandwidth.

1 47. (Previously Presented) The computer-readable medium claim 46, wherein the  
2 second behavioral treatment results in the data flow having a different achieved  
3 flow bandwidth, which is a different percentage of the network bandwidth.

1 48. (Previously Presented) The computer-readable medium of claim 5, wherein the  
2 determining of the second behavioral treatment is in response to a determination

3 of achieved flow bandwidth resulting from the determining of the achieved flow  
4 bandwidth.

1 49. (Previously Presented) The computer apparatus as in claim 9, wherein the first  
2 behavioral treatment is determined without regard to the achieved flow  
3 bandwidth.

1 50. (Previously Presented) The computer apparatus as in claim 9, wherein the second  
2 behavioral treatment is a behavioral treatment that provides a lower level of  
3 service than other available choices of behavioral treatments; and  
4 wherein the second behavioral treatment provides a high enough level of service  
5 to accommodate the achieved flow bandwidth.

1 51. (Previously Presented) The computer apparatus as in claim 9, wherein the second  
2 behavioral treatment is a behavioral treatment that provides a minimum level of  
3 service that is a sufficient level of service to accommodate the achieved flow  
4 bandwidth.

1 52. (Previously Presented) The computer apparatus as in claim 9, wherein the step of  
2 marking the first group is performed by at least communicating the first  
3 behavioral treatment to a differentiated services node located at a border of a  
4 differentiated services domain; and  
5 wherein the step of marking the second group is performed by at least  
6 communicating the second behavioral treatment to the differentiated  
7 services node.



1    53.    (Canceled)

1    54.    (Canceled)

1    55.    (Previously Presented) The computer apparatus as in claim 9, wherein the step of  
2           determining the achieved flow bandwidth is performed by at least estimating the  
3           achieved flow bandwidth based on Management Information Base (MIB)  
4           variables.

1    56.    (Previously Presented) The computer apparatus as in claim 9, wherein the step of  
2           determining the achieved flow bandwidth is performed by at least checking a  
3           Transfer Control Protocol/ Internet Protocol (TCP/IP) window size and  
4           determining a value for the achieved flow bandwidth based on the TCP/IP  
5           window size.

1    57.    (Previously Presented) The computer apparatus as in claim 9, wherein the step of  
2           determining the achieved flow bandwidth is based on reception quality feedback  
3           from a Real-Time Transport Protocol (RTP) receiver.

1    58.    (Currently Amended) A computer apparatus comprising:  
2           a processor; and  
3           a memory coupled to the processor, the memory containing one or more  
4           sequences of instructions for marking one or more packets of data in a  
5           packet-switched network based on achieved flow bandwidth information  
6           within the network, wherein execution of the one or more sequences of

7 instructions by the processor causes the processor to perform the ~~method~~  
8 ~~including at least~~ steps of:  
9 receiving a first group of packets of a plurality of data flows from the network;  
10 marking the first group of packets of said plurality of data flows with an initial set  
11 of behavioral treatment values, wherein the ~~first~~ initial set of behavioral  
12 treatment values direct devices within the network to treat the first group  
13 of packets with an initial set of quality of service treatments;  
14 transmitting the first group of packets of said plurality of data flows in the  
15 network;  
16 determining achieved flow bandwidths, wherein an achieved flow bandwidth is  
17 determined for each of the plurality of data flows based on data traffic  
18 within the network;  
19 determining packet flow characteristics of the first group of packets of said  
20 plurality of data flows;  
21 determining an updated set of behavioral treatment values based on the achieved  
22 flow bandwidths within the network and on the packet flow characteristics  
23 of the first group of packets;  
24 receiving a second group of packets of said plurality of data flows from the  
25 network;  
26 after the steps of marking the first group and determining the updated set of  
27 behavioral treatment values, marking the second group packets of said  
28 plurality of data flows with said updated set of behavioral treatment  
29 values, wherein the updated set of behavioral treatment values direct

30 devices within the network to treat the second group of packets with an  
31 updated set of quality of service treatments that is different than the initial  
32 set of quality of service treatments; and  
33 transmitting the second group of packets of said plurality of data flows in the  
34 network; and  
35 repeating the preceding steps for successive groups of packets of said plurality of  
36 data flows, wherein each of the successive groups is dynamically marked  
37 with a set of behavioral treatment values that is determined based at least  
38 in part on successively determined achieved flow bandwidths for said  
39 plurality of data flows;  
40 wherein the computer apparatus is any one of a bridge, a switch, and a router.

1 59. (Currently Amended) A computer apparatus comprising:  
2 a processor; and  
3 a memory coupled to the processor, the memory containing one or more  
4 sequences of instructions for marking one or more packets of data in a  
5 packet-switched network based on achieved flow bandwidth information  
6 within the network, wherein execution of the one or more sequences of  
7 instructions by the processor causes the processor to perform the ~~method~~  
8 ~~including at least~~ steps of:  
9 defining an initial set of Quality of Service (QoS) values for coloring packets  
10 within a plurality of data flows, wherein each of the QoS values indicates  
11 an allocation of bandwidth;

12 coloring a first group of one or more packets of a given data flow selected from  
13 the plurality of data flows, without regard to an achieved flow bandwidth,  
14 by at least:  
15 communicating the initial set of QoS values to each of one or more edge  
16 differentiated services domain nodes that are located at one or  
17 more edges of a differentiated services domain, and  
18 the one or more edge differentiated services domain nodes using one or  
19 more of the initial set of QoS values to color the first group;  
20 estimating traffic bandwidth within the network based on bandwidth information  
21 corresponding to a current traffic pattern of the network, wherein the  
22 traffic bandwidth estimated includes an achieved flow bandwidth for the  
23 given data flow;  
24 determining packet flow characteristics of the first group of one or more packets  
25 of the given data flow;  
26 determining an updated set of QoS values for coloring packets within the plurality  
27 of data flows, based on the traffic bandwidth estimated and on the packet  
28 flow characteristics of the first group of one or more packets,  
29 wherein the updated set of QoS values provide lower levels of service than  
30 other available choices of QoS values, and  
31 wherein the updated set of QoS values provide a high enough level of  
32 service to accommodate the traffic bandwidth estimated;  
33 coloring a subsequent group of one or more packets of the given data flow with  
34 the one or more of updated set of QoS values by at least;

35 communicating the updated set of QoS values to each of one or more edge  
36 differentiated services domain nodes, and  
37 the one or more edge differentiated services domain nodes using one or  
38 more of the updated set of QoS values to color the subsequent  
39 group; and  
40 repeating the steps of estimating traffic bandwidth, determining packet flow  
41 characteristics, determining an updated set of QoS values, and coloring a  
42 subsequent group multiple times, therein tuning the network on an  
43 ongoing basis;  
44 wherein the computer apparatus is any one of a bridge, a switch, and a router.

1 60. (Previously Presented) The computer apparatus as in claim 58, wherein the initial  
2 set of QoS values is an initial set of Differentiated Services Codepoint (DSCP)  
3 values;  
4 wherein the updated set of QoS values is an updated set of DSCP values;  
5 wherein the step of estimating traffic bandwidth further comprises the steps of:  
6 defining one or more QoS policies that specify target bandwidth values  
7 and a range of possible services for each the plurality of data  
8 flows, wherein a given target bandwidth value is specified for the  
9 given data flow, and wherein the given target bandwidth identifies  
10 a specific bandwidth that is desirous or required by the given data  
11 flow;  
12 gathering information about the traffic bandwidth; and  
13 determining the traffic bandwidth based on the information gathered.

1    61.    (Previously Presented) The computer apparatus of claim 9, wherein the data flow  
2            is associated with only one behavioral treatment at any given time.

1    62.    (Previously Presented) The computer apparatus of claim 58, wherein each data  
2            flow is associated with only one behavioral treatment at any given time.

1    63.    (Previously Presented) The computer apparatus of claim 9, wherein the achieved  
2            flow bandwidth is a percentage of the network bandwidth.

1    64.    (Previously Presented) The computer apparatus claim 63, wherein the second  
2            behavioral treatment results in the dataflow having a different achieved flow  
3            bandwidth, which is a different percentage of the network bandwidth.

1    65.    (Previously Presented) The computer apparatus of claim 9, wherein the  
2            determining of the second behavioral treatment is in response to a determination  
3            of achieved flow bandwidth resulting from the determining of the achieved flow  
4            bandwidth.